SD3D Media Generator Software

User Manual

Version: Draft 0.20

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Introduction to SD3D Media Generator

The SD3D Media Generator is a software package designed to allow generation and manipulation of video effects in a real-time environment. It can be used in several areas of application where real-time generation of video effects is required which does not typically lend itself to traditional linear-based methods.

In complex live show environments, events can be very spontaneous. The visualist needs to react very quickly to changing events. The right tools are required to create seemingly unique and complex visual effects at a moments notice. The SD3D Media Generator addresses these needs by providing a system that allows the visualist to access a full complement of media attributes using the Elation Professional Series of DMX consoles. Unlike other traditional VJ software or media software packages, SD3D exposes every parameter via a DMX channel so users can take advantage of the DMX program features of the Elation Professional Show Designer series of control desks and apply them to their compositions.

System Overview

The SD3D Media Generator System is comprised of the following components:

- Suite of software programs which includes the Digital Asset Manager, the SD3D Media Generator Main Program and the Configuration Utility.
- A Library of Digital content which includes videos, 3D objects, Particles, and Masks
- A DMX USB Hardware Adapter that interfaces an Elation Show Designer DMX console to the computer and a USB Cable.
- A USB Dongle Key which allows users to use the System on multiple machines (at any one time).

The SD3D Media Generator Main Program is the run-time software that allows the user to manipulate and generate video effects under the control of the Elation Professional Show Designer series of DMX Controller Consoles.

Before using the Main Program, the digital media assets need to be assigned, organized and managed using the Digital Asset Manager before they are available for use by the Main Program.

The Configuration Utility is used to set up the initial operating state of the system before first use.

Installation Requirements

MINIMUM SYSTEM REQUIREMENTS

For SD3D to run properly, your computer must meet the following specifications:

▪OPERATING SYSTEM	Microsoft Windows XP Home Edition or Microsoft Windows XP Professional Edition
▪PROCESSOR	AMD Athlon™ 64 (Socket 939) Processors 3.0 Ghz or better OR optional AMD Athlon™ 64 X2 Dual-Core Processor OR Intel Pentium 4 - 3 Ghz or better OR Intel Duo Core or Dual Core 2 at 2.0 Ghz. 1 GHz system bus with 2000MT/s Hyper- Transport link.
▪MEMORY	Dual-channel DDR 400/333 (2) DIMM slots (1 to 2GB)
▪MOTHERBOARD	NVIDIA nForce™ 4 SLI recommended 1GHz (2000MT/s) HyperTransport™ enhanced System Bus (2) x1 PCI-E slot or compatible
▪GRAPHICS	NVIDIA® GeForce™ 7900 GT or later model
▪AUDIO	Stereo output
▪STORAGE	Serial ATA 150 minimum storage recommended 100 Gb

You MUST have Windows XP (or XP derivatives – Home or Media Center) or better to run the Elation SD3D System.

Setup and Installation

PACKAGE CONTENTS

1. (1) Installation / Content Library CD
2. (1) USB Security Dongle
3. (1) DMX-USB Interface
4. (1) USB Cable
5. (1) User Manual

INSTALLATION PROCEDURE

1. Insert the Installation CD in your CD drive. To install the SD3D Software, go to the CD drive and double-click the file "Installation CD". Follow the steps on the installation process. DO NOT change the default installation directory to anything other then C:\Elation.

2. Insert your USB security dongle into one of your USB ports. When Windows XP ask for drivers select the drivers from the location: C:\Elation\ElationSecurity\XP_2K_9X

3. Connect the DMX-USB Interface using the USB cable, and when prompted for drivers, find the drivers in the installation CD folder: "DMX INTERFACE DRIVER". *TIP: Copy this folder into your computer so whenever you connect your DMX interface into a different USB port, you won't require the Installation CD.*

4. Copy all the "Content Library" files and folders from the CD into one of the drives in your computer. These are the media files that are included with the software. You may add your personal files as well. We recommend you organize and categorize the media into separate folders. This makes it easier in the future to search for media content in a show environment.

5. Connect the Elation Professional Show Designer Intelligent DMX Console to the DMX-USB interface using a 3-pin DMX Cable (not included).

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Once the installation has been finalized, you will find two new icons on your desktop: “ELATION SD3D” and “ELATION AM”.

To test the setup, we recommend you start by adding a minimum number of media assets to the system using the Elation AM software.

Window Names

There are two primary (floating) windows in the Elation AM system.

The “Main” window is the window that displays the various layers in a tab dialog format. The “Preview” window is a Windows Media Player that is used to preview video clips and some digital stills.

There are several (floating) windows in the Elation SD3D Media Generator Main Program system.

The “Render” window is the output window that displays the final video output of the generated visual effects. This is the window that is generally connected to the external projection system during a show performance.

The “Control” window or main GUI is the main control interface. It is the user interface from which to control the behavior of the SD3D.

The “Virtual Console” window is the virtual DMX console window. It is a window that is activated by pressing the icon. This window can be moved around anywhere on the desktop.

The “Operating Graphical Modes” window is used to set the window sizes and positions of the windows for different monitor and operating modes.

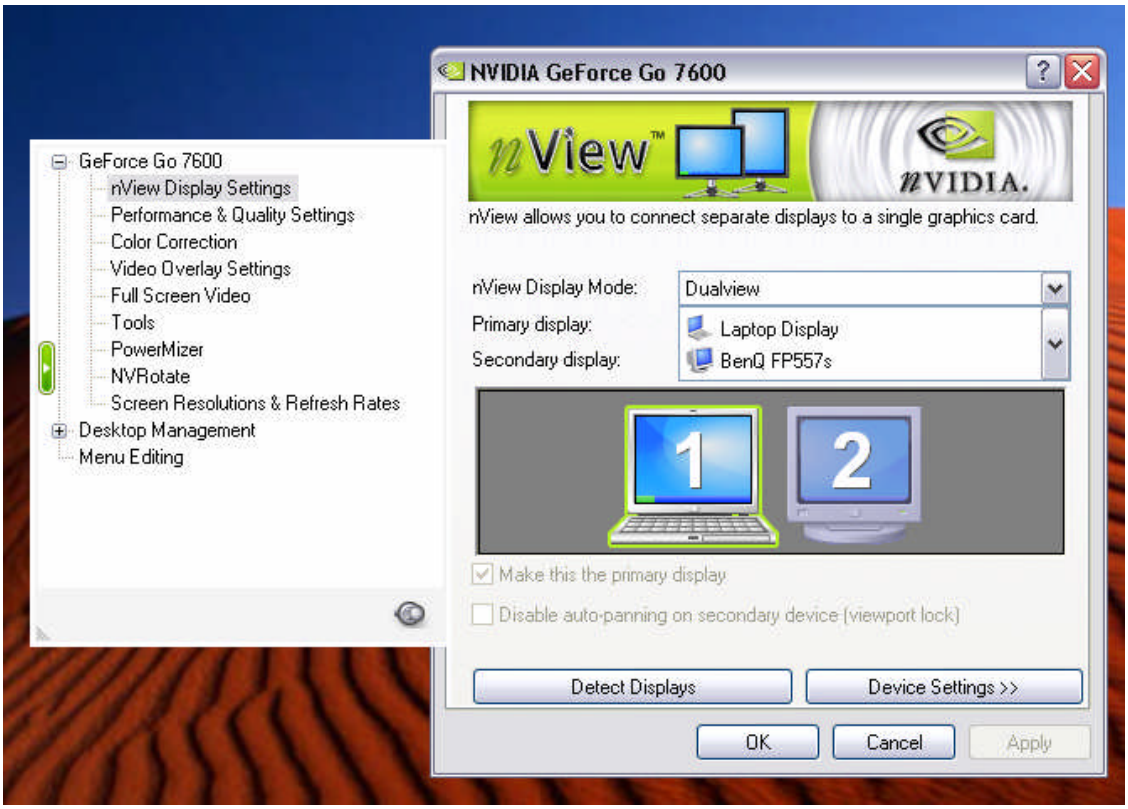
The “Watch Parameters” window is used to provide the descriptions for the DMX/Virtual Console channels for each individual layer.

Multi-Monitor Setup

The Elation SD3D Media Generator was designed for a minimum two monitor setup. Although the software runs in a single monitor mode, it is somewhat cumbersome to use due to the number of windows that fill up the screen. The single monitor mode was really designed for offline programming of scenes using a laptop where there are fewer options for adding a secondary monitor.

In a two monitor configuration, it is important to assign the proper monitor to be the primary monitor. The reason for this is that the 3D acceleration built-in to most graphics cards are designed to provide accelerated features on the primary monitor. As a general convention, the render window (output video) will be the left-most monitor assigned to the desktop. The software is designed to follow this convention.

The Elation SD3D software is optimized for NVIDIA Graphics Cards with built-in 3D acceleration. If you have an ATI graphics card, some of the features of the Elation SD3D will not work properly – namely the videos.



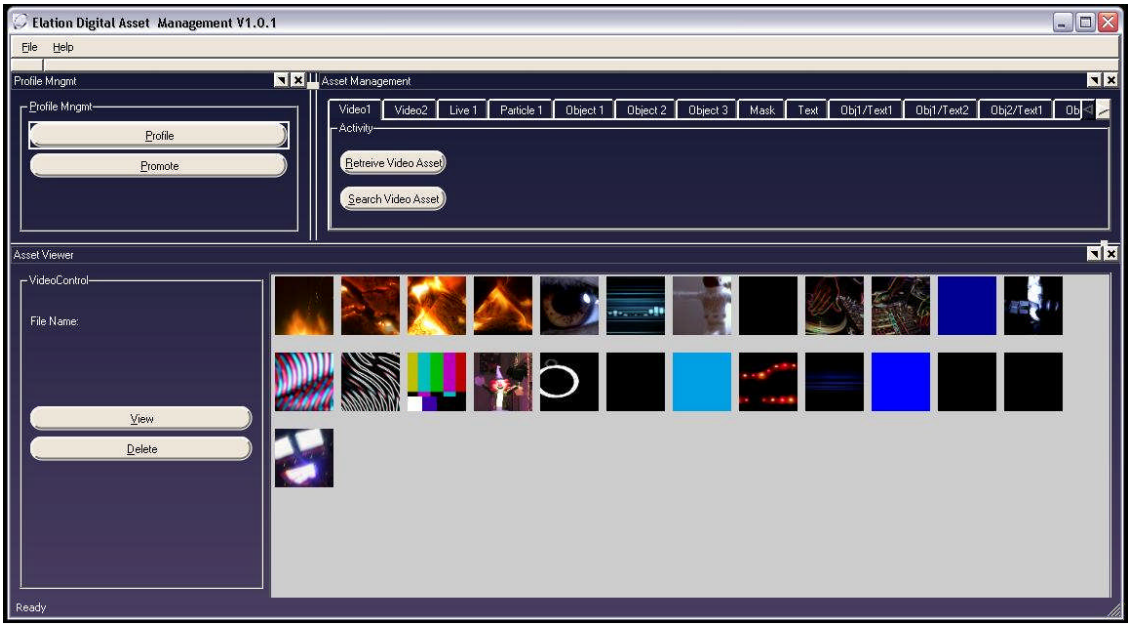
In the above example, the laptop display is the primary monitor which means that the render window should reside within the laptop display area for maximum performance. The Main GUI window should reside on the Secondary monitor.

In a show situation, this is not a practical setup because the primary monitor should be the external monitor (and it should also be the monitor located on the left side) so that it can be connected to the external projector. The laptop display should be the secondary display. Unfortunately, many laptops cannot be configured in a way that it is optimal for show use. However, they are great for offsite programming. Some laptops can be configured in a way that they can be used for live show performances. We will be test a range of laptops and qualify them for use in live show applications. We will release documentation as we proceed with the qualification process.

Digital Media Assets and Elation AM (Asset Manager)

Media files and clips are the foundation for your work in the SD3D Media Generator System. Media files are the raw materials you use to create your final real-time rendered visual effects. Media files on your hard drive are not automatically useable by the SD3D system. They need to be imported to the layer that you want to have them available in the Main Program. This is accomplished using the Elation AM (Asset Manager).

ASSET MANAGER



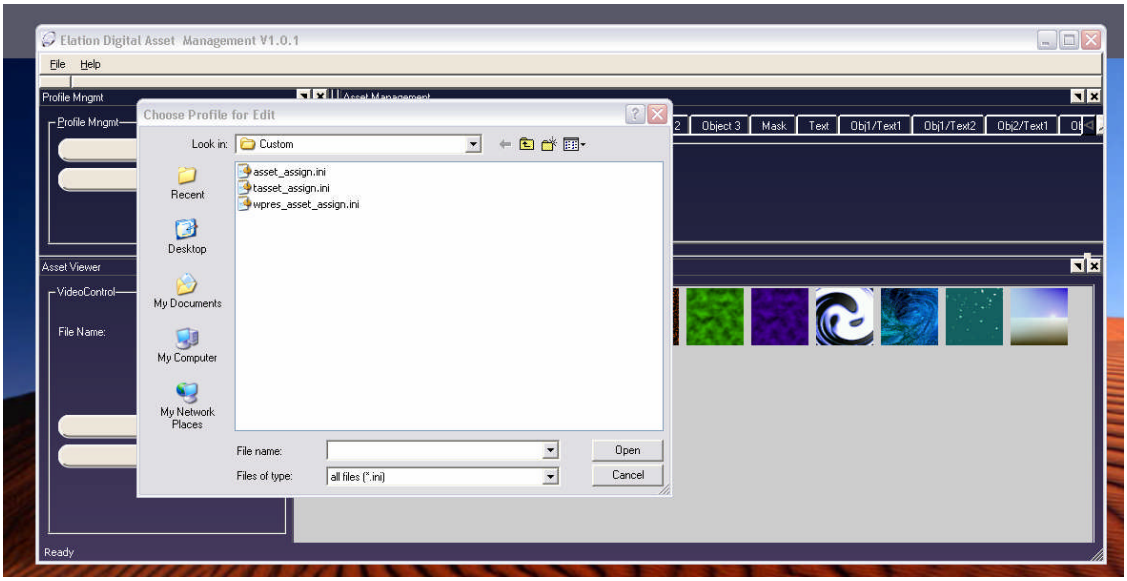
PROFILES

Typically, you create a profile for each show you plan to work on. A profile is like a project – it defines the media assets for each of the layers you plan to use for the show.

The file for the default profile is asset_assign.ini. The Elation AM program always defaults to this when it starts up. Your shows should be based on the default profile. To create a new profile, go to ”Profile” in “Profile Mngmt” on the upper left quadrant of the Elation AM screen.

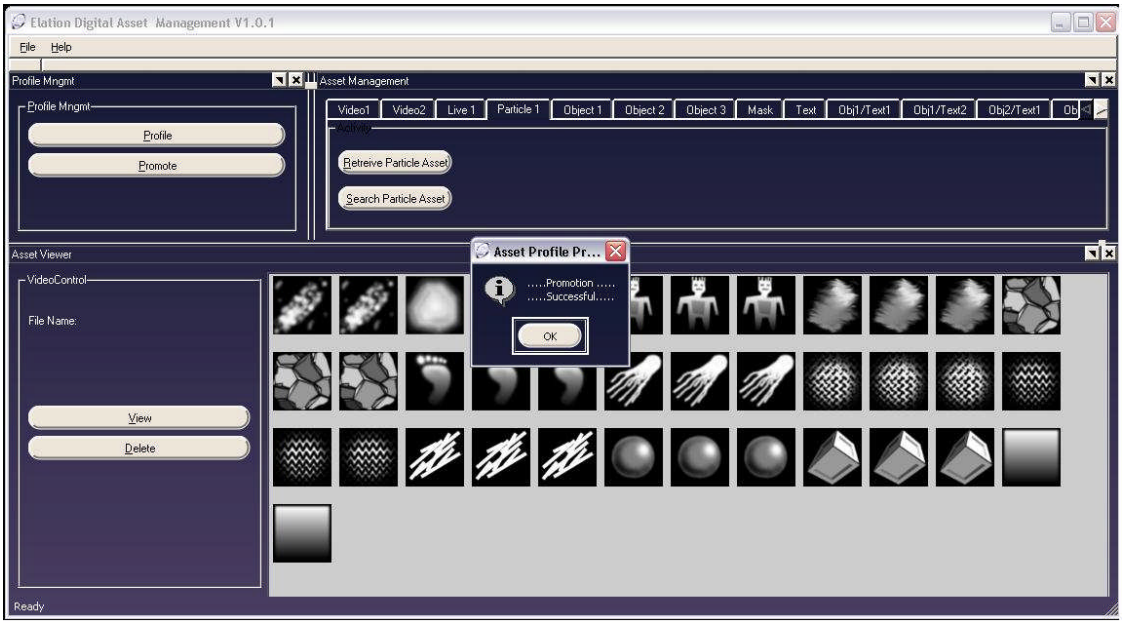
You can also save different profiles with different asset configurations for different shows, for doing this, follow the procedure:

1. Click on Profile button.
2. Click once on “asset_assign.ini” and then right click on it and copy it.
3. Rename the “Copy of asset_assign.ini” to any name you want
4. Select this new profile and start modifying it and repopulate it.



You may have as many profiles as you want, just remember to promote the profile once finalized with population of all your assets.

Once you have populate the Elation Digital AM, click on the button called “Promote” you will get a message saying “Promotion Successful” this means that all your asset files have been promote it as active profile to be used in the SD3D software.



CREATING MEDIA ASSETS

Media assets are created from different sources. The SD3D System relies mostly on other Media creation software or capture devices to provide the raw media assets.

Graphical files (png, tga, jpg, bmp and pcx) can be created using a good graphics editor like Adobe Photoshop, Paintshop Pro or Microsoft Paint.

3D objects can be created using 3D Studio Max, Lightwave 3D or TrueSpace.

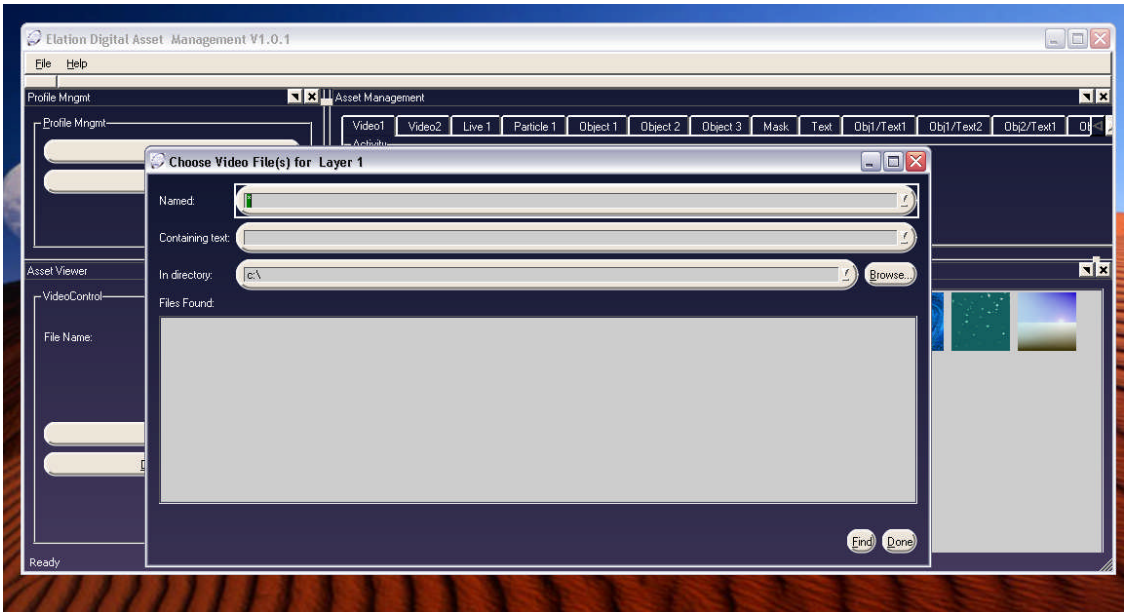
Video files are created using a variety of video capture devices such as video cameras. Libraries of videos can be purchased through publishers of custom video content.

The Elation SD3D System can import a variety of industry standard media asset formats.

IMPORTING ASSETS INTO SYSTEM

Every tab in the top represents every layer, and the correspondent type of files associated with it. In the first tab you have Video1 which is the first layer. By clicking on “Retrieve Video Asset” button, you can browse your computer and find any video files that you may want SD3D to playback.

You can also click on “Search Video Asset” to find specific files containing part of the filename. There is also an optional search for text within files for those files with embedded text descriptions. Some video files have text descriptions embedded in files.



The supported file formats for video are: .avi, .mpeg, .mpg, .mov and .wmv .

You may add as many files as you want per layer to a theoretical maximum of 65536 files per layer.

The types of files associated per layer are;

VIDEO LAYER: .avi, .mpeg, .mpg, .mov and .wmv .

LIVE LAYER: N/A

PARTICLE LAYER: .png, .tga, jpg, .bmp, .pcx, .avi (cinepack codec only)

3D OBJECT: .3DS, .X and .NMO

TEXTURES: .png, .tga, jpg, .bmp, .pcx, .avi (cinepack codec only)

OVERLAY MASK: .png, .tga, jpg, .bmp, .pcx

PREVIEWING IMPORTED ASSETS

You can play or view the imported assets by selecting the thumbnail and hitting the "view" button. Or you can double-click the thumbnail.

INSERTING AND DELETING IMPORTED ASSETS

You can insert new assets into an existing asset palette by selecting the thumbnail previous to the insertion point. If you wish to append new assets to the end, select the last thumbnail. Selecting the thumbnail is just a matter of left-clicking the mouse over the thumbnail.

You can also delete a single asset by selecting the thumbnail of asset and hitting the "Delete" button. If you wish to delete more than one asset, use the Windows convention for selection multiple assets (CTRL+left mouse click or SHIFT+left mouse click) and then press the "Delete" button.

Production Workflow

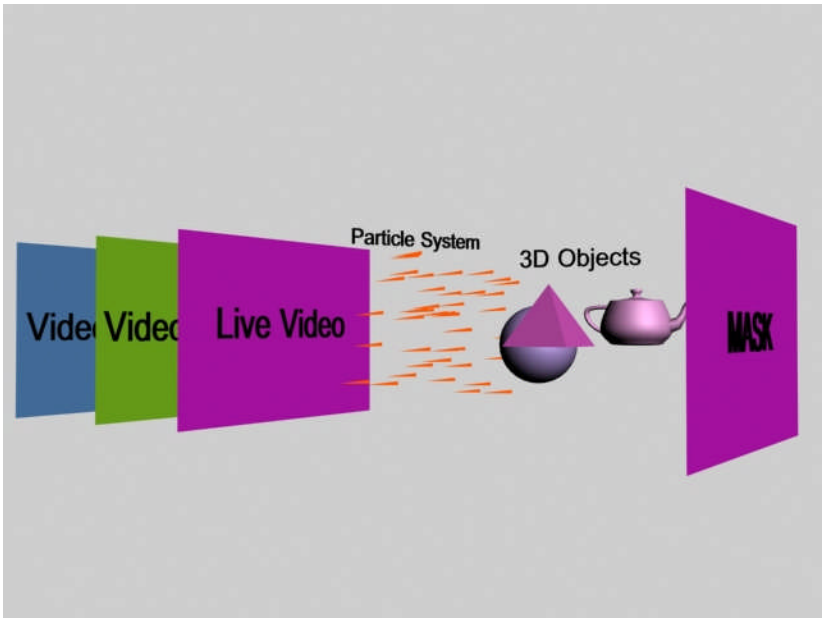
Begin with organizing your media assets on your hard drive. There are four main categories of media assets – videos clips, particles files, 3D object files and mask files.

Next populate the system with the appropriate media assets for that layer using the Elation AM.

In review, SD3D Media Generator has 9 layers of media. This means that you can display at any given time 9 different elements layered one on top of each other or one side by side of each other. The 9 layers of media are categorized as follows:

- 2 layers of Video playback
- 1 layer of Live input video
- 1 layer of Particle system generation
- 3 layers of 3D geometrical object shapes
- 1 layer of Overlay Mask
- 1 Layer of 3D live Text

The Render priority of these 9 layers is illustrated in the following diagram:



THE FIXTURE PATCH

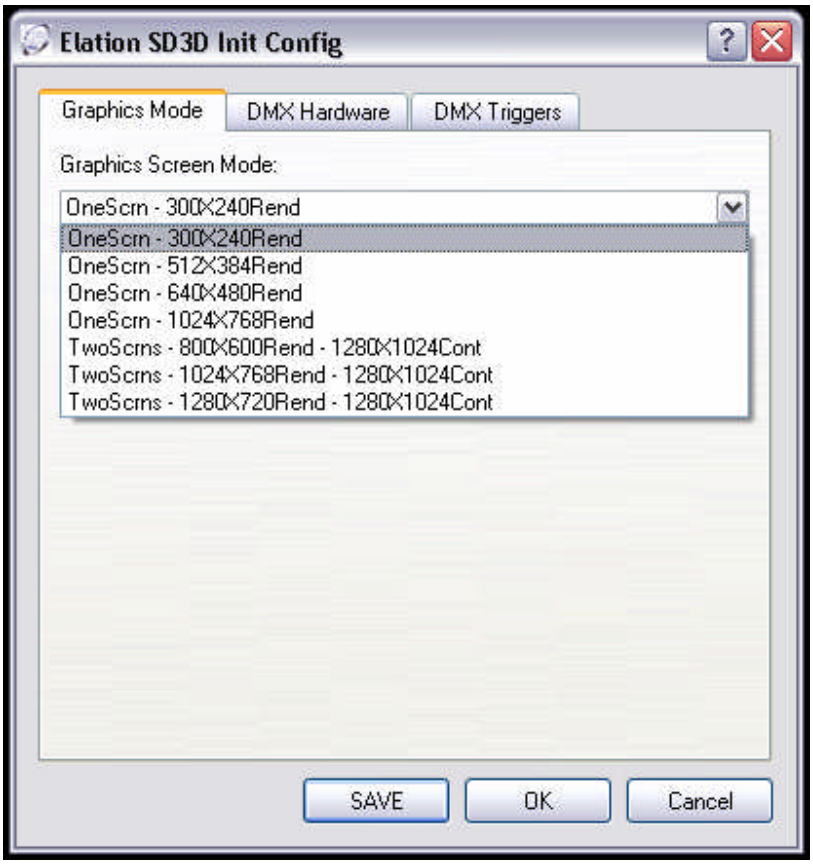
Every layer in SD3D behaves as a moving light fixture. There are 7 types of fixtures on SD3D:

- GLOBAL FIXTURE (8 DMX Channels) (1 Fixture)
- VIDEO FIXTURE (30 DMX Channels) (2 Fixtures)
- LIVE FIXTURE (24 DMX Channels) (1 Fixture)
- PARTICLE FIXTURE (25 DMX Channels) (1 Fixture)
- 3D OBJECT FIXTURE (32 DMX Channels) (3 Fixtures)
- OVERLAY MASK FIXTURE (9 DMX Channels) (1 Fixture)
- LIVE 3D TEXT (12 DMX Channels) (1 Fixture)

A total of 10 fixtures have to be patched in your DMX board, please see Channel mapping and behavior chart in Appendix 1 for more details.

SD3D Initialization

The SD3D Initialization utility allows the user to select some pre-execution settings before starting the application for the first time



These settings refer to the screen size and resolution and multiple screen setup, DMX hardware used as DMX interface and the configuration for triggering internal scenes with DMX channels.

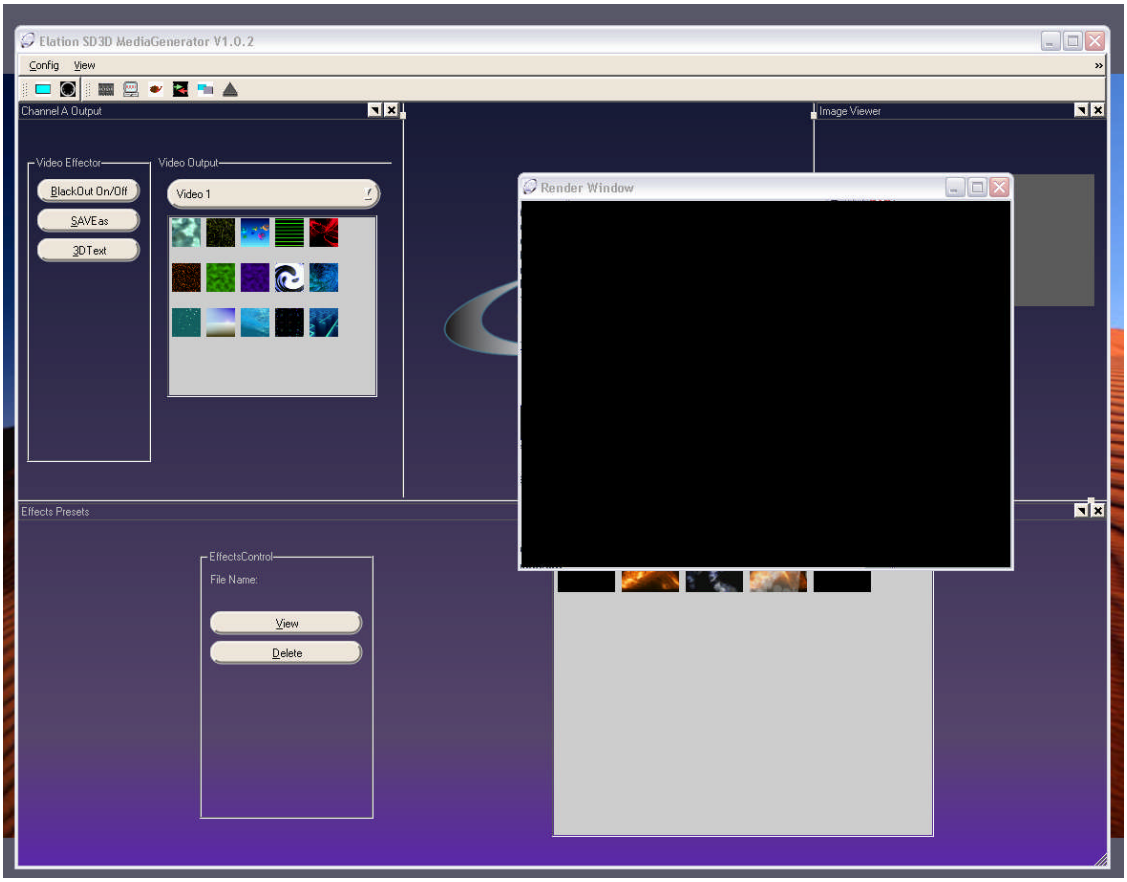
You must run this application before running SD3D for the first time.

SD3D Main Program

The Elation SD3D Media Generator is the main operating software for manipulating and rendering visual effects in real-time.

This program is started by double-clicking the Elation SD3D Icon on the desktop.

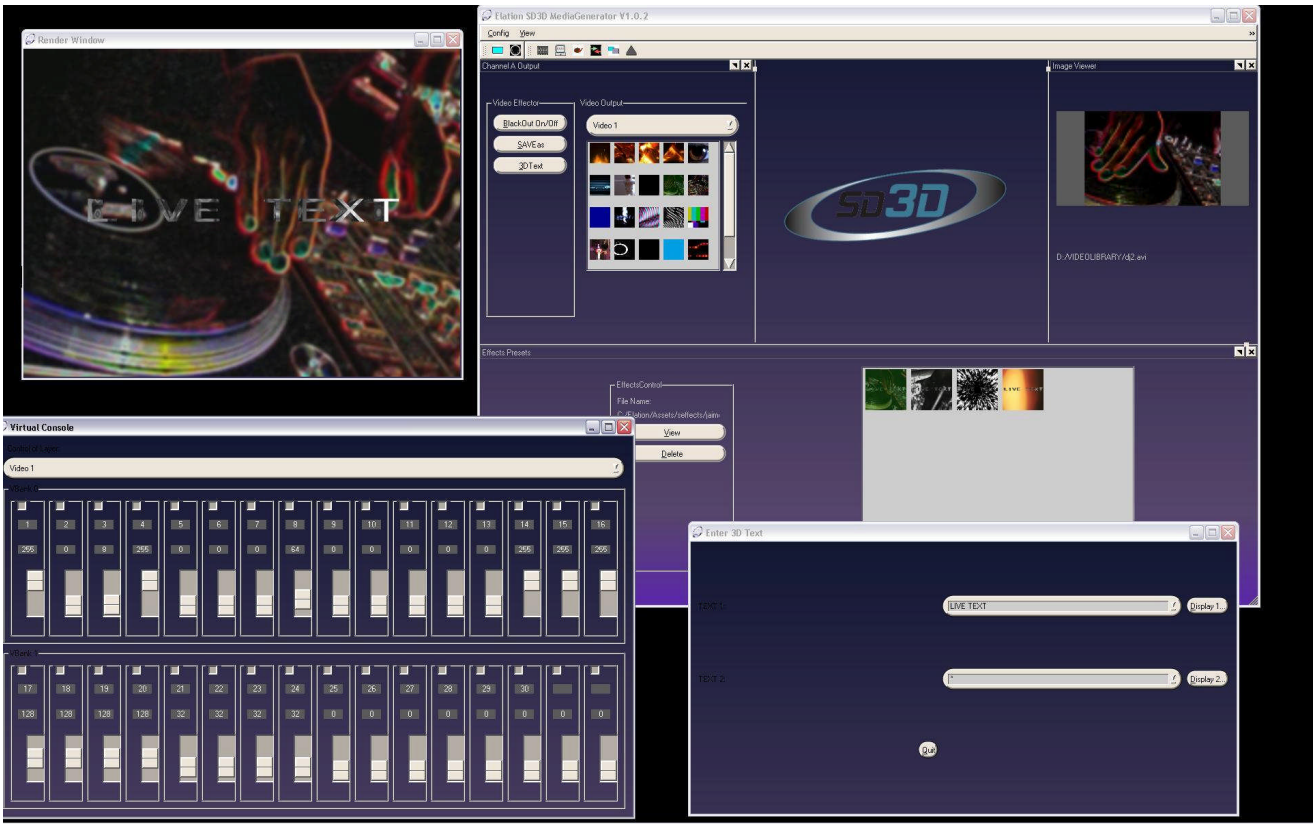
When started, two windows will appear on the screen as follows:



The main GUI screen is the control screen.

Visual effects are generated to the Render Window. The default Render Window size and the placement of windows, in general, are determined when you first configured the SD3D System using the Elation SD3D Initialization utility.

UNDERSTANDING THE INTERFACE:



SCREEN AREAS:

The SD3D software is divided into 4 main areas. The SD3D Toolbar located across the top allows users to access the secondary functions available on the system. These functions include the following:

- Video Configuration
- DMX Configuration
- Virtual DMX Console
- Selecting Operating Graphics Mode
- Attribute Description Viewer
- Asset Sync
- Windows Position Save
- Refresh Render Window

CHANNEL A OUTPUT

The upper-right area is the "Channel A Output" area. This area encloses several options that are related to the Channel A video output. The main feature of this area is the Media Asset Palette. The thumbnail content of the palette represents the current media assets available for use in the selected layer. The contents of the palette changes according to the current operating layer selected. To select or change the current operating layer, use the drop down combo box located above palette window. Changing the current operating layer in the drop down box on the Virtual Console screen also affects the Media Asset Palette.

The "Blackout ON/Off" button toggles between Video ON and Video OFF.

The "SAVE as" button saves the current Visual Effect as a Preset. A file dialog will appear on the screen. You can enter any file name you want with a ".sef" file extension. The Visual Effect Preset represented as a thumbnail will appear in the Effects Preset screen area.

The "3DText" button opens a dialog that allows the user to enter text. Use the "Text1" to output to "Channel A" Video Channel. Text2 is for future use to "Channel B".

IMAGE VIEWER

Located on the upper-left area of the main SD3D GUI is the "Image Viewer" area. This is basically a magnified view of the selected thumbnail in the Media Asset Palette.

EFFECTS PRESETS

Located on the lower area of the main SD3D GUI is the “Effects Presets” area. This area shows through thumbnails, the user defined Video Presets.

The “View” button executes the selected Preset. To select, click the thumbnail you want to execute. You can also double-click the thumbnail to execute the preset.

The “Delete” button deletes the Preset from the Preset palette.

THE ICONS IN THE TOP (TOOLBAR):

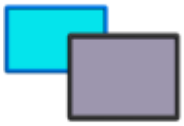
Virtual Console: Allows the user to interact with SD3D via virtual faders, or to monitor DMX activity in the channels.

Layer Description: Shows every layer and its attributes per channel.

DMX configuration: Allows the user to set up the DMX map channels and customize it. DO NOT change the dmx mapping unless you are qualified to do so. In the future, there will be a published document on how to re-map the DMX channel assignment to allow for customized virtual and physical consoles.

Render Screen Recall: If the render screen window has been closed, this button recalls the screen.

Screen Configuration: Allows the user to select the screen configuration and render output resolution.


Save GUI configuration: Allows the user to save the current window configuration and window positioning on the screen.

Re-synchronize assets: Allows the user to update the database of assets that has been added and promoted in the Digital Asset Manager. If both the Elation AM and SD3D software are running simultaneously, it is possible to modify the media assets of each layer and have them updated in SD3D by pressing this button. If media assets have been updated to replace other assets, the Presets or the scrolling position of the assets within the layer may change. i.e. if asset 5 has changed, scrolling to position value 5 will no longer display replaced asset 5. Objects DO NOT get updated using re-synchronize assets, they will be synchronized the next time you run the application.

Screen output configuration**:** Future Development

"3D TEXT" BUTTON: allows the user to access the dialogue box to broadcast a 3D text message on the screen. (Please note that Intensity on Fixture Live Text has to be full on for this to work)

"SAVE AS" BUTTON: Allows the user to save internally presets effects that can be recall by simply double click on their thumbnail, or click once and then click on "view" button.

"BLACK OUT" BUTTON: Allows the user to black out the scene and stop output momentarily.

DOCK and FLOATING WINDOWS

Most of the windows in the system are floating or docked (but can be floated) windows. Sometimes this can be a problem when your screen real estate is small and the floating windows end up behind each other. The system has been designed to work with many screen options which can span from one to up to three screens. There are many combinations of screen configurations that the user can set the system to operate under. Unfortunately, this means it is easy to get some windows behind other windows. They basically disappear and unless you know the Windows XP system well, it may be difficult to get back to a point where you have full access to all the operating windows within your screen real estate.

If you ever get into a situation where you have a full screen render window covering the whole of your single screen, it may appear that the computer has crashed. Try pressing Alt-F4 on your keyboard. This will close the render window. You can then re-arrange or move your main GUI to another location or change the size of the render window to accommodate your screen real estate. You can recall your render screen by pressing the icon.

VIRTUAL CONSOLE

The Virtual Console which is invoked by pressing the icon on the tool bar.
The Virtual Console allows the user to interact with SD3D via virtual faders or to monitor DMX activity in the channels.

The Virtual Console is designed to reflect the fader functionality of the attached Elation Show Designer Intelligent DMX Console. If you are using the software on a laptop away from the Elation Console you can use the system and program presets using the Virtual Console.

The drop down combo box located on the top of the Virtual Console window allows you to change the current working media asset layer. The fader functionality and/or their DMX channel views will change according to the layer selected. For layers with media asset content, the Media Asset Palette Window and Media Asset Viewer will change accordingly to reflect the layer you are currently operating on. As you scroll through the media content of the working layer, the Media Asset Viewer will reflect the asset selection.

CREATING VISUAL EFFECTS

Creating complex visual effects is achieved through manipulating each of the nine (9) media asset layers. The best way to learn how to create effects is to play with the attributes of each layer as they are applied to the media assets and observe the outcome. Through experience, you will be able to create the desired effect quickly and cued to the show performance you are at.

LAYER CONTROL

Master (Global) Layer: The 12 Channels of Master layer.

1 and 2: MAPPED TO NULL: These two channels are for further development.

3, 4 and 5: RED, GREEN and BLUE: These are the master RGB that affects the 3D Scene and the tint of the 3D lighting on the 3D objects.

6, 7 and 8: RED, GREEN and BLUE in the BACKGROUND: These channels control the tint on the background environment.

9 and 10: LIGHTS: These are 3D lights that affect the 3D environment. You can see the effect that these produce on the 3D entities such as 3D objects.

11 and 12: Field of View (FOV): This works as a zoom in or zoom out camera action, but it changes the optical lens that the virtual camera is using in the scene.

Video Layer: This applies to both Video 1 and Video 2 layers. The 30 attributes or called parameters of the Video Layer fixture behave in the following way:

1: INTENSITY: Controls the Intensity of the video layer, 0=100% transparent (invisible) , 255=100% Solid (fully visible) please note that Intensity doesn't start or load the video, video can be running even if the intensity is at full or cannot be running even if the intensity is at 255 or 100%.

2 and 3: FILE COARSE AND FINE: Controls the file location correspondent to the location assign in the Digital Asset Manager. The combination of these 2 DMX channels generates the position. i.e. File# 586 would be in File Coarse= 3, File Fine= 74.
File # 30 would be in File Coarse=0, File Fine=30.

4: FILE GO: This channel controls the play or stop of the video clip. When is beyond 50% it plays the file that has been selected when is below 50% it stops the playback of the video. NOTE: for efficiency purposes make sure that in any cue that you are not using

the video layer, your “File Go” channel is below 50% or at 0. Remember that even if the Intensity is at 0% video can still be playing on the background.

5: AUDIO GAIN: This channel controls the gain of the audio in the video file if the Video file has audio associated with it.

6 and 7: VIDEO IN/OUT: Controls the position of the video for start and end. Values 0 to 255 will control the starting and end point and will loop the video between those two positions.

8: VIDEO SPEED: The values 0 to 255 controls the speed of the video, where 64 or 25% correspond as the native speed of the video clip played and 255 corresponds 4 times the native speed of the video clip while value=0 pause the video.

9: FX1: This channel creates 4 different effects on the video. They are selected by reaching range values as 0 to 25%, 26 to 50%, 51 to 75%, 76 to 100%.

10: FX2: Corresponds to Mosaic effect where the image multiplies on the screen.

11, 12 and 13: CHROMA DELT, HUE AND LUMINANCE: These channels control the amount of “Chroma” key applied to the video layer and if applied will overwrite the FX1 channel.

14, 15 and 16: RED, GREEN AND BLUE: This 3 channels change the Tint of the video layer with RGB parameters.

17, 18, 19 and 20: POSITION X and POSITION Y: These channels control the position of the video layer in the scene. The center is defined by values of 128 in each of these channels; please note that these channels are 16bit DMX channels which means that the combination of channel 17 and 18 actually produce the position X, while 19 and 20 produce position Y, so this allows the user to have 65536 units of positioning in every axis.

21, 22, 23 and 24: SCALE X and SCALE Y: These channels control the size of the video. They work in a similar way as the positioning with consequently coarse and fine channels, which means 16bit DMX.

25,26, 27,28, 29 and 30: ROTATION X,Y and Z: These channels control the rotation in every access of the video plane allowing changes on the perspective.

Live Layer: This applies to Layer 3 which is the "Live" layer. The 24 attributes or called parameters of the Live Layer fixture behave in the following way:

1: INTENSITY: Controls the Intensity of the Live layer, 0=100% transparent (invisible) , 255=100% Solid (fully visible) please note that Intensity doesn't start or load the video, video can be running even if the intensity is at full or cannot be running even if the intensity is at 255 or 100%.

2: INPUT SELECTOR: Selects camera to stream.

3: FX1: This channel creates 4 different effects on the Live Video, they are selected by reaching range values as 0 to 25%, 26 to 50%, 51 to 75%, 76 to 100%.

4: FX2: Corresponds to Mosaic effect where the image multiplies on the screen.

5, 6 and 7: CHROMA DELT, HUE AND LUMINANCE: These channels control the amount of "Chroma" key applied to the video layer and if applied will overwrite the FX1 channel.

8, 9 and 10: RED, GREEN AND BLUE: This 3 channels change the Tint of the video layer with RGB parameters.

11, 12, 13 and 24: POSITION X and POSITION Y: These channels control the position of the video layer in the scene. The center is defined by values of 128 in each of these channels; please note that these channels are 16bit DMX channels which means that the combination of channel 17 and 18 actually produce the position X, while 19 and 20 produce position Y, so this allows the user to have 65536 units of positioning in every axis.

15, 16, 17 and 18: SCALE X and SCALE Y: These channels control the size of the video. They work in a similar way as the positioning with consequently coarse and fine channels, which means 16bit DMX.

19, 20, 21, 22, 23 and 24: ROTATION X, Y and Z: These channels control the rotation in every access of the video plane allowing changes on the perspective.

Particle Layer: This applies to Particle Layer 1. The 30 attributes or called parameters of the Particle Layer fixture behave in the following way:

1: INTENSITY: Controls the Intensity of the video layer, 0=100% transparent (invisible) , 255=100% Solid (fully visible) please note that Intensity doesn't start or load the video, video can be running even if the intensity is at full or cannot be running even if the intensity is at 255 or 100%.

2 and 3: FILE COARSE AND FINE: Controls the file location correspondent to the location assign in the Digital Asset Manager. The combination of these 2 DMX channels generates the position. i.e. File# 586 would be in File Coarse= 3, File Fine= 74.
File # 30 would be in File Coarse=0, File Fine=30.

4: PARTICLE MODE: Determine what type of particle generation will be used. There are 4 types of particle modes, and they are separated every 25% in the value of this channel.
5: PARTICLE SPEED: Speed of the particle.
6: ANGULAR SPEED: Speed of rotation of the particle in its own axis
7: PARTICLE LIFE TIME: Determine the life of the particle. It the particle is a video clip it also affects the speed of the video clip. The short is the life time the faster the video would play. Video format accepted is .avi cinepack codec.
8: PARTICLE GRAVITY: Affects gravity on the particle making it float or drop. Value at 50% Gravity is at 0 which means will just stay weightless.
9: SCALE INITIAL: Sets the initial size of the particle sprite when it's generated
10: SCALE END: Sets the end size of the particle when it dies.
11,12, and 13: RED GREEN AND BLUE INITIAL: Sets the initial color of the particle sprite when it's generated
14, 15, 16: RED GREEN AND BLUE END: Sets the end color of the particle when it dies.
17, 18, 19: POSITION X, Y and Z: Positions the particle generator in 3D space.
20, 21, 22: SCALE X, Y and Z: Scales the Particle generator in 3D space.
23, 24, 25: ROTATE X, Y and Z: Rotates the particle generator in 3D space.

3D Object Layer: This applies to layers Object 1, Object 2 and Object 3. The 32 attributes or called parameters of the Object Layer fixture behave in the following way:

1: INTENSITY: Controls the level of transparency of the 3D object. If you have a transparency layer in your textures depending on your levels of intensity these transparency properties will become more noticeable.

2: 3D Entity Selector: Browses through the 3D files that you may have loaded in the Asset Manager. These files could be .3DS, .X or .NMO

3, 4, 5 and 6: TEXTURE 1 and TEXTURE 2 Coarse and Fine: These are the two layers of textures that the 3D entity has. While the first texture layer applies skin to the object, the second layer applies bump mapping and transparency.

7, 8 and 9: RED, GREEN AND BLUE: Controls the tint on the 3D shape. And the tint of the texture mapped around it.

10: ANIMATION STEP: If the 3D object has a morph animation, this channel allows you to go through the steps of the animation and select a particular stage of that animation.

11: ANIMATION SPEED: If the 3D Object has a morph animation, this channel allows the user to control the speed the animation. 0=paused, 255=400% speed.

12, 13 and 14: AUTO ROTATE: This function allows the user to put an autorotation into the 3D object. It can rotate in both senses and any axis.

15, 16, 17, 18, 19, 20: POSITION X, Y AND Z (COARSE AND FINE): Positions the 3D Object in the 3D space. Center is exactly at 50% of the channels values. Please note these are 16bit DMX channels.

21, 22, 23, 24, 25, 26: SCALE X, Y AND Z (COARSE AND FINE): Scale the 3D Object in the 3D space. Natural Size is exactly at 25% of the channels values. Please note these are 16bit DMX channels.

26, 27, 28, 29, 30, 31, 32: ROTATE X, Y, and Z (COARSE AND FINE): Set the orientation of the 3D Object in the 3D space. Native Orientation is exactly at 0% of the channels values. Please note these are 16bit DMX channels.

Mask Layer: This applies to Mask Layer. The 30 attributes or called parameters of the Mask Layer fixture behave in the following way:

1: INTENSITY: Controls the Intensity of the video layer, 0=100% transparent (invisible) , 255=100% Solid (fully visible) please note that Intensity doesn't start or load the video, video can be running even if the intensity is at full or cannot be running even if the intensity is at 255 or 100%.

2 and 3: FILE COARSE AND FINE: Controls the file location correspondent to the location assign in the Digital Asset Manager. The combination of these 2 DMX channels generates the position. i.e. File# 586 would be in File Coarse= 3, File Fine= 74.
File # 30 would be in File Coarse=0, File Fine=30.

4,5, 6 and 7: POSITION X and Y COARSE AND FINE: Positions the Overlay Mask in 2D space. These are 16 bit DMX channels.
8: SCROLLING: Controls the speed of the scrolling and sense.
9: VERTICAL OR HORIZONTAL: Determines if the scrolling is vertical or horizontal.

Text Layer: This applies to the Text Layer. The 30 attributes or called parameters of the Video Layer fixture behave in the following way:

1: INTENSITY: Controls the Intensity of the video layer, 0=100% transparent (invisible) , 255=100% Solid (fully visible) please note that Intensity doesn't start or load the video, video can be running even if the intensity is at full or cannot be running even if the intensity is at 255 or 100%.

2 and 3: FILE COARSE AND FINE: Controls the file location correspondent to the location assign in the Digital Asset Manager. The combination of these 2 DMX channels generates the position. i.e. File# 586 would be in File Coarse= 3, File Fine= 74.
File # 30 would be in File Coarse=0, File Fine=30.
4, 5 and 6: RED, GREN AND BLUE: Controls the tint on the 3D shape. And the tint of the texture mapped around it.
7, 8 and 9: Scale X, Y and Z: Scales the text in these 3 axis. Please note that these channels are 8 bit DMX resolution.
10, 11 and 12: AUTO ROTATE: This function allows the user to put an autorotation into the 3D text. It can rotate in both senses and any axis.

SETTING UP CAMERA FOR LIVE VIDEO:
You may have up to 8 cameras connected to your equipment. This could be through a capture device, or USB cameras, or fire wire.
Please make sure that the device is being recognized by windows system first. When using with SD3D, no other software or programs can be using the cameras or the capture devices.
To select the camera you want to use, use camera selector channel. The selection is made by percentages. Each camera is located in threshold of 12.5% each

Creating Presets in SD3D

1. Make sure you have populated and promoted your assets in all different layers in your Digital Asset Manager.

2. Once you have put all your assets in the Digital Asset Manager, open the SD3D software, it will take some time to load so please wait until you get the message on screen that says “System Ready”

3. Once the software is fully running, please click on Virtual Console Icon.

4. If you are not using a DMX controller you may use the virtual console that SD3D has. The software loads with the defaults values.

5. Select Video 1 Layer then select the desired video that you want to play by moving the File Coarse and Fine channels. The Coarse and Fine channels work as a combination of both channels to allocate a maximum of 65536 files or 256 virtual locations of 256 sub-locations each. i.e. to select video file =1 (File Coarse=0, File Fine=0) or to select video file =257 (File Coarse=1, File Fine=0) and so on...

6. Once selected the video that you want to play, please move File Go channel beyond 50% this will automatically make the video layer playback that file.

7. You may add more layers or effects just by selecting them and going through the procedure of adjust the parameters. Once you have created your look, click on the button “SAVE AS” and save your preset. A thumbnail will be generated and a message saying that Preset has been saved will pop up on the screen.

8. You can save as unlimited presets as possible and recall them by either double click or click once and then the “view” button.

Test Setup and Tutorial

Just to get better acquainted with and at the same time test the functionality of the system, we will walk through the process of installing software, importing media assets into the system and then rendering video effects in real-time.

1. Install System by executing SD3DInstall from the CD Installation Disk.

2. Install Library Of Media Content.

3. Connect DMX console to DMX-USB adapter. Connect DMX-USB adapter to computer.

4. Install drivers as requested by Windows XP.

5. Plug in USB Key. Install drivers as requested by Windows XP. Directory of drivers is in c:\Elation\ElationSecurity.

6. Start Elation AM (Digital Asset Manager).

7. Create a custom profile from the default profile by using “Profile” button in the “Profile Mngmt” area.

8. Populate each layer with minimum media content. Let’s say 4 items per layer. So do 7 layers (Video 1, Video 2, Particle 1, Object 1, Object 2, Object 3 and Mask). And apply 4 textures to Text1 and 4 textures to Text2 for each of the 3 Object layers)

9. Promote the profile so the SD3D system can use your custom profile.

10. At this time you can close your Elation AM software if you want. You can also minimize it and come back to it to add more medias assets later on.

11. Open the main SD3D software by double-clicking on Elation SD3D. The boot up time can take up to one minute.

12. It is a wise move to set the startup render mode as the first Preset by going to “SAVE as” button and saving this as “default.sef”.

13. If you have an Elation Show Designer DMX console, configure it to match the channel attributes of the SD3D system.

14. Check to see if the SD3D is receiving DMX data from the console by playing with channels 6, 7 and 8 of the Master Layer. Sliding channel 8 for Master Layer of the Elation Show Designer to 255 should change the Render Screen red. If it does not, make sure all the connections between the console and computer are secure. Ensure the DMX console is programmed according to the DMX assignment as described in Appendix 1. If the connections are correct, the faders on the Virtual Console should move in unison with the faders you are moving on the Elation Show Designer.

15. The Video Output Media Asset Palette should have the 4 thumbnails you defined in the Elation AM. If they do not appear, perhaps you forgot to promote the media assets.

16. Go to either the Virtual Console or Elation Show Designer Console and navigate to Video 1 Layer. Move channel 1 (intensity) to value 255. Move channel 4 (file go) to value 255. Move channel 3 (file fine select) to value 1. You should be able to see video asset 1 on the render window. Move channel 1 (intensity) back to 0.

17. Go through all the other 7 layers - Video 2, Live Camera (only if connected), Particle 1, Object 1, Object 2, Object 3, Mask and Text. The layers other than Video only require the intensity to be increased to make them visible. Experiment with the other parameters to see how they affect the video output.

18. Try to save some visual effects as Presets. And recalling them.

19. Have Fun!

Specifications

Supported Operating System: Windows XP, Windows XP Media Edition or Windows XP Home

Number of Media Asset Layers : 9

Media Layers: 2 Video, 1 Live, 1 Particle, 3 3D Object, 1 Mask and 1 Text.

Graphical File Formats Supported: png, tga, jpg and bmp

Video Formats Supported: avi, mpeg1, mpeg2, mpeg4, mov and wmv.

3D Object File Formats: 3DS, X and NMO

Video Effects: Luminance, Chromakey, RGB, X,Y,Z translation, XYZ Rotation, Mosaic

Supported DMX Consoles: Elation Show Designer1, 2CF and 3

Number of DMX Channels: 0 to 450

Number of DMX Universes needed: 1

Troubleshooting

DMX INIT ERROR- Drivers for DMX-USB adapter not installed.

NOT RECEIVING DMX DATA- Check cable between Elation Show Designer DMX console and the DMX-USB adapter. Check cable between DMX-USB adapter and computer.

PREVIEWING IMPORTED ASSET DOES NOT WORK- System does not support file format if some assets can be previewed, whist others can't. If none can be previewed, be sure you have Microsoft Windows Media Player 10 for Windows XP.

ALL LAYERS HAVE SAME BEHAVIOR- This is caused by the application NOT installed into the default directory.

3D OBJECTS, MASKS AND PARTICLES APPEAR ON RENDER WINDOW, BUT VIDEOS DO NOT- Make sure you have an NVIDIA graphics card.

Appendix 1

DMX Assignment and Behavior Table

Global

DMX CH -1	DESCRIPTION	DMX CHANNEL	BEHAVIOR IN A CONTROL DESK	DMX CHANNEL FIXTURE	DEFAULT
0	NULL	1	MAPPED TO NOTHING	0	
1	NULL	2	NULL	1	0
2	MASTER	3	CROSSFADE	2	255
3	R GLOBAL	4	CROSSFADE	3	255
4	G GLOBAL	5	CROSSFADE	4	255
5	B GLOBAL	6	CROSSFADE	5	255
6	R BACKGROUND	7	CROSSFADE	6	0
7	G BACKGROUND	8	CROSSFADE	7	0
8	B BACKGROUND	9	CROSSFADE	8	0
9	BACKGROUND LIGHT SELECTOR	10	CROSSFADE	9	255
10	FOREGROUND LIGHT SELECTOR 2	11	CROSSFADE	10	255
11	FOV course	12	CROSSFADE	11	128
12	FOV fine	13	CROSSFADE	12	128
13	NULL	14	CROSSFADE	13	128
14	NULL	15	CROSSFADE	14	128
15	NULL	16	CROSSFADE	15	128
16	NULL	17	CROSSFADE	16	128
17	NULL	18	CROSSFADE	17	128
18	NULL	19	CROSSFADE	18	128
19	NULL	20	CROSSFADE	19	128
20	NULL	21	CROSSFADE	20	128
21	NULL	22	CROSSFADE	21	0
22	NULL	23	CROSSFADE	22	0
23	NULL	24	CROSSFADE	23	0
24	NULL	25	CROSSFADE	24	0
25	NULL	26	CROSSFADE	25	0
26	NULL	27	CROSSFADE	26	0
27	NULL	28	CROSSFADE	27	0
28	NULL	29	CROSSFADE	28	0
29	NULL	30	CROSSFADE	29	0
30	NULL	31	CROSSFADE	30	0

Video 1

31	VIDEO 1 INTENSITY	32	CROSSFADE	1	0
32	VIDEO 1 FILE COARSE	33	SNAP BEFORE CROSSFADE	2	0
33	VIDEO 1 FILE FINE	34	SNAP BEFORE CROSSFADE	3	0
34	VIDEO 1 FILE GO	35	SNAP AFTER CROSSFADE	4	0
35	VIDEO 1 PRELOAD	36	SNAP BEFORE CROSSFADE	5	0
36	VIDEO 1 IN	37	SNAP AFTER CROSSFADE	6	0
37	VIDEO 1 OUT	38	SNAP AFTER CROSSFADE	7	0
38	VIDEO 1 SPEED	39	SNAP BEFORE CROSSFADE	8	64
39	VIDEO 1 EFFECT 1	40	SNAP BEFORE CROSSFADE	9	0
40	VIDEO 1 EFFECT 2	41	CROSSFADE	10	0
41	VIDEO 1 CHROMA DELTA	42	CROSSFADE	11	0
42	VIDEO 1 CHROMA HSL	43	CROSSFADE	12	0
43	VIDEO 1 CHROMA LUMINANCE	44	CROSSFADE	13	0
44	VIDEO 1 R	45	CROSSFADE	14	255
45	VIDEO 1 G	46	CROSSFADE	15	255
46	VIDEO 1 B	47	CROSSFADE	16	255
47	VIDEO1 X POS COARSE	48	CROSSFADE	17	128
48	VIDEO 1 X POS FINE	49	CROSSFADE	18	128
49	VIDEO 1 Y POS COARSE	50	CROSSFADE	19	128
50	VIDEO 1 Y POS FINE	51	CROSSFADE	20	128
51	VIDEO 1 X SCALE COARSE	52	CROSSFADE	21	32
52	VIDEO 1 X SCALE FINE	53	CROSSFADE	22	32
53	VIDEO 1 Y SCALE COARSE	54	CROSSFADE	23	32
54	VIDEO 1 Y SCALE FINE	55	CROSSFADE	24	32
55	VIDEO 1 X ROT COARSE	56	CROSSFADE	25	0
56	VIDEO 1 X ROT FINE	57	CROSSFADE	26	0
57	VIDEO 1 Y ROT COARSE	58	CROSSFADE	27	0
58	VIDEO 1 Y ROT FINE	59	CROSSFADE	28	0
59	VIDEO 1 Z ROT COARSE	60	CROSSFADE	29	0
60	VIDEO 1 Z ROT FINE	61	CROSSFADE	30	0

Video 2

61	VIDEO 2 INTENSITY	62	CROSSFADE	1	0
62	VIDEO 2 FILE COARSE	63	SNAP BEFORE CROSSFADE	2	0
63	VIDEO 2 FILE FINE	64	SNAP BEFORE CROSSFADE	3	0
64	VIDEO 2 FILE GO	65	SNAP AFTER CROSSFADE	4	0
65	VIDEO 2 STOP/PLAY	66	SNAP BEFORE CROSSFADE	5	0
66	VIDEO 2 IN	67	SNAP AFTER CROSSFADE	6	0
67	VIDEO 2 OUT	68	SNAP AFTER CROSSFADE	7	0
68	VIDEO 2 SPEED	69	SNAP BEFORE CROSSFADE	8	64
69	VIDEO 2 EFFECT 1	70	SNAP BEFORE CROSSFADE	9	0
70	VIDEO 2 EFFECT 2	71	CROSSFADE	10	0
71	VIDEO 2 CHROMA DELTA	72	CROSSFADE	11	0
72	VIDEO 2 CHROMA HSL	73	CROSSFADE	12	0
73	VIDEO 2 CHROMA LUMINANCE	74	CROSSFADE	13	0
74	VIDEO 2 R	75	CROSSFADE	14	255
75	VIDEO 2 G	76	CROSSFADE	15	255
76	VIDEO 2 B	77	CROSSFADE	16	255
77	VIDEO 2 X POS COARSE	78	CROSSFADE	17	128
78	VIDEO 2 X POS FINE	79	CROSSFADE	18	128
79	VIDEO 2 Y POS COARSE	80	CROSSFADE	19	128
80	VIDEO 2 Y POS FINE	81	CROSSFADE	20	128
81	VIDEO 2 X SCALE COARSE	82	CROSSFADE	21	32
82	VIDEO 2 X SCALE FINE	83	CROSSFADE	22	32
83	VIDEO 2 Y SCALE COARSE	84	CROSSFADE	23	32
84	VIDEO 2 Y SCALE FINE	85	CROSSFADE	24	32
85	VIDEO 2 X ROT COARSE	86	CROSSFADE	25	0
86	VIDEO 2 X ROT FINE	87	CROSSFADE	26	0
87	VIDEO 2 Y ROT COARSE	88	CROSSFADE	27	0
88	VIDEO 2 Y ROT FINE	89	CROSSFADE	28	0
89	VIDEO 2 Z ROT COARSE	90	CROSSFADE	29	0
90	VIDEO 2 Z ROT FINE	91	CROSSFADE	30	0

Video 3 (Future Development)

91	NULL	**92**	CROSSFADE	**1**
92	NULL	**93**	SNAP BEFORE CROSSFADE	**2**
93	NULL	**94**	SNAP BEFORE CROSSFADE	**3**
94	NULL	**95**	SNAP AFTER CROSSFADE	**4**
95	NULL	**96**	SNAP BEFORE CROSSFADE	**5**
96	NULL	**97**	SNAP AFTER CROSSFADE	**6**
97	NULL	**98**	SNAP AFTER CROSSFADE	**7**
98	NULL	**99**	SNAP BEFORE CROSSFADE	**8**
99	NULL	**100**	SNAP BEFORE CROSSFADE	**9**
100	NULL	**101**	CROSSFADE	**10**
101	NULL	**102**	CROSSFADE	**11**
102	NULL	**103**	CROSSFADE	**12**
103	NULL	**104**	CROSSFADE	**13**
104	NULL	**105**	CROSSFADE	**14**
105	NULL	**106**	CROSSFADE	**15**
106	NULL	**107**	CROSSFADE	**16**
107	NULL	**108**	CROSSFADE	**17**
108	NULL	**109**	CROSSFADE	**18**
109	NULL	**110**	CROSSFADE	**19**
110	NULL	**111**	CROSSFADE	**20**
111	NULL	**112**	CROSSFADE	**21**
112	NULL	**113**	CROSSFADE	**22**
113	NULL	**114**	CROSSFADE	**23**
114	NULL	**115**	CROSSFADE	**24**
115	NULL	**116**	CROSSFADE	**25**
116	NULL	**117**	CROSSFADE	**26**
117	NULL	**118**	CROSSFADE	**27**
118	NULL	**119**	CROSSFADE	**28**
119	NULL	**120**	CROSSFADE	**29**
120	NULL	**121**	CROSSFADE	**30**

Live Camera 1

121	LIVE 1 INTENSITY	122	CROSSFADE	1	0
122	CAMERA SEL	123	SNAP BEFORE FADE	2	32
123	LIVE 1 EFFECT 1	124	SNAP BEFORE CROSSFADE	3	0
124	LIVE 1 EFFECT 2	125	SNAP BEFORE CROSSFADE	4	0
125	LIVE 1 CHROMA DELTA	126	CROSSFADE	5	0
126	LIVE 1 CHROMA HSL	127	CROSSFADE	6	0
127	LIVE 1 CHROMA LUMINANCE	128	CROSSFADE	7	0
128	LIVE 1 R	129	CROSSFADE	8	255
129	LIVE 1 G	130	CROSSFADE	9	255
130	LIVE 1 B	131	CROSSFADE	10	255
131	LIVE 1 X POS COARSE	132	CROSSFADE	11	128
132	LIVE 1 X POS FINE	133	CROSSFADE	12	128
133	LIVE 1 Y POS COARSE	134	CROSSFADE	13	128
134	LIVE 1 Y POS FINE	135	CROSSFADE	14	128
135	LIVE 1 X SCALE COARSE	136	CROSSFADE	15	32
136	LIVE 1 X SCALE FINE	137	CROSSFADE	16	32
137	LIVE 1 Y SCALE COARSE	138	CROSSFADE	17	32
138	LIVE 1 Y SCALE FINE	139	CROSSFADE	18	32
139	LIVE 1 X ROT COARSE	140	CROSSFADE	19	0
140	LIVE 1 X ROT FINE	141	CROSSFADE	20	0
141	LIVE 1 Y ROT COARSE	142	CROSSFADE	21	0
142	LIVE 1 Y ROT FINE	143	CROSSFADE	22	0
143	LIVE 1 Z ROT COARSE	144	CROSSFADE	23	0
144	LIVE 1 Z ROT FINE	145	CROSSFADE	24	0

Live Camera 2 (Future Development)

145	NULL	**146**	CROSSFADE	**1**
146	NULL	**147**	SNAP BEFORE CROSSFADE	**2**
147	NULL	**148**	SNAP BEFORE CROSSFADE	**3**
148	NULL	**149**	SNAP BEFORE CROSSFADE	**4**
149	NULL	**150**	CROSSFADE	**5**
150	NULL	**151**	CROSSFADE	**6**
151	NULL	**152**	CROSSFADE	**7**
152	NULL	**153**	CROSSFADE	**8**
153	NULL	**154**	CROSSFADE	**9**
154	NULL	**155**	CROSSFADE	**10**
155	NULL	**156**	CROSSFADE	**11**
156	NULL	**157**	CROSSFADE	**12**
157	NULL	**158**	CROSSFADE	**13**
158	NULL	**159**	CROSSFADE	**14**
159	NULL	**160**	CROSSFADE	**15**
160	NULL	**161**	CROSSFADE	**16**
161	NULL	**162**	CROSSFADE	**17**
162	NULL	**163**	CROSSFADE	**18**
163	NULL	**164**	CROSSFADE	**19**
164	NULL	**165**	CROSSFADE	**20**
165	NULL	**166**	CROSSFADE	**21**
166	NULL	**167**	CROSSFADE	**22**
167	NULL	**168**	CROSSFADE	**23**
168	NULL	**169**	CROSSFADE	**24**

Particle 1

169	PARTICLE 1 INTENSITY	170	CROSSFADE	1	0
170	PARTICLE 1 TEXTURE SELECTOR COARSE	171	SNAP BEFORE CROSSFADE	2	0
171	PARTICLE 1 TEXTURE SELECTOR FINE	172	SNAP BEFORE CROSSFADE	3	0
172	PARTICLE 1 MODE SELECTOR	173	SNAP BEFORE CROSSFADE 0%, 25% 50%, 75% 100%	4	0
173	PARTICLE 1 LINEAR SPEED	174	CROSSFADE	5	32
174	PARTICLE 1 ANGULAR SPEED	175	CROSSFADE	6	0
175	PARTICLE 1 LIFE TIME	176	CROSSFADE	7	64
176	PARTICLE 1 GRAVITY	177	CROSSFADE	8	128
177	PARTICLE 1 SCALE INITIAL	178	CROSSFADE	9	64
178	PARTICLE 1 SCALE ENDING	179	CROSSFADE	10	64
179	PARTICLE 1 R INITIAL	180	CROSSFADE	11	255
180	PARTICLE 1 G INITIAL	181	CROSSFADE	12	255
181	PARTICLE 1 B INITIAL	182	CROSSFADE	13	255
182	PARTICLE 1 R END	183	CROSSFADE	14	255
183	PARTICLE 1 G END	184	CROSSFADE	15	255
184	PARTICLE 1 B END	185	CROSSFADE	16	255
185	PARTICLE 1 X POS COARSE	186	CROSSFADE	17	128
186	PARTICLE 1 Y POS COARSE	187	CROSSFADE	18	128
187	PARTICLE 1 Z POS COARSE	188	CROSSFADE	19	128
188	PARTICLE 1 X SCALE COARSE	189	CROSSFADE	20	128
189	PARTICLE 1 Y SCALE COARSE	190	CROSSFADE	21	128
190	PARTICLE 1 Z SCALE COARSE	191	CROSSFADE	22	128
191	PARTICLE 1 X ROT COARSE	192	CROSSFADE	23	0
192	PARTICLE 1 Y ROT COARSE	193	CROSSFADE	24	0
193	PARTICLE 1 Z ROT COARSE	194	CROSSFADE	25	0

Particle 2 (Future Development)

194	NULL	**195**	CROSSFADE	**1**	0
195	NULL	**196**	SNAP BEFORE CROSSFADE	**2**	0
196	NULL	**197**	SNAP BEFORE CROSSFADE	**3**	0
197	NULL	**198**	SNAP BEFORE CROSSFADE 0%, 25% 50%, 75% 100%	**4**	0
198	NULL	**199**	CROSSFADE	**5**	32
199	NULL	**200**	CROSSFADE	**6**	0
200	NULL	**201**	CROSSFADE	**7**	64
201	NULL	**202**	CROSSFADE	**8**	128
202	NULL	**203**	CROSSFADE	**9**	64
203	NULL	**204**	CROSSFADE	**10**	64
204	NULL	**205**	CROSSFADE	**11**	255
205	NULL	**206**	CROSSFADE	**12**	255
206	NULL	**207**	CROSSFADE	**13**	255
207	NULL	**208**	CROSSFADE	**14**	255
208	NULL	**209**	CROSSFADE	**15**	255
209	NULL	**210**	CROSSFADE	**16**	255
210	NULL	**211**	CROSSFADE	**17**	128
211	NULL	**212**	CROSSFADE	**18**	128
212	NULL	**213**	CROSSFADE	**19**	128
213	NULL	**214**	CROSSFADE	**20**	128
214	NULL	**215**	CROSSFADE	**21**	128
215	NULL	**216**	CROSSFADE	**22**	128
216	NULL	**217**	CROSSFADE	**23**	0
217	NULL	**218**	CROSSFADE	**24**	0
218	NULL	**219**	CROSSFADE	**25**	0

Object 1

219	OBJECT INTENSITY	220	CROSSFADE	1	0
220	OBJECT 3D ENTITY SELECTOR	221	SNAP AFTER CROSSFADE	2	0
221	OBJECT TEXTURE SELECTOR COARSE 1	222	SNAP BEFORE CROSSFADE	3	0
222	OBJECT TEXTURE SELECTOR FINE 1	223	SNAP BEFORE CROSSFADE	4	0
223	OBJECT TEXTURE SELECTOR COURSE 2	224	SNAP BEFORE CROSSFADE	5	0
224	OBJECT TEXTURE SELECTOR FINE 2	225	SNAP BEFORE CROSSFADE	6	0
225	OBJECT R	226	CROSSFADE	7	255
226	OBJECT G	227	CROSSFADE	8	255
227	OBJECT B	228	CROSSFADE	9	255
228	OBJECT ANIMATION STEP	229	SNAP AFTER CROSSFADE	10	0
229	OBJECT ANIMATION SPEED	230	SNAP AFTER CROSSFADE	11	128
230	AUTO ROTATE X	231	SNAP BEFORE CROSSFADE	12	0
231	AUTO ROTATE Y	232	SNAP BEFORE CROSSFADE	13	0
232	AUTO ROTATE Z	233	SNAP BEFORE CROSSFADE	14	0
233	OBJECT X POS COARSE	234	CROSSFADE	15	128
234	OBJECT X POS FINE	235	CROSSFADE	16	128
235	OBJECT Y POS COARSE	236	CROSSFADE	17	128
236	OBJECT Y POS FINE	237	CROSSFADE	18	128
237	OBJECT Z POS COARSE	238	CROSSFADE	19	128
238	OBJECT Z POS FINE	239	CROSSFADE	20	128
239	OBJECT X SCALE COARSE	240	CROSSFADE	21	64
240	OBJECT X SCALE FINE	241	CROSSFADE	22	64
241	OBJECT Y SCALE COARSE	242	CROSSFADE	23	64
242	OBJECT Y SCALE FINE	243	CROSSFADE	24	64
243	OBJECT Z SCALE COARSE	244	CROSSFADE	25	64
244	OBJECT Z SCALE FINE	245	CROSSFADE	26	64
245	OBJECT X ROT COARSE	246	SNAP BEFORE FADE	27	0
246	OBJECT X ROT FINE	247	SNAP BEFORE FADE	28	0
247	OBJECT Y ROT COARSE	248	SNAP BEFORE FADE	29	0
248	OBJECT Y ROT FINE	249	SNAP BEFORE FADE	30	0
249	OBJECT Z ROT COARSE	250	SNAP BEFORE FADE	31	0
250	OBJECT Z ROT FINE	251	SNAP BEFORE FADE	32	0

Object 2

251	OBJECT INTENSITY	252	CROSSFADE	1	0
252	OBJECT 3D ENTITY SELECTOR	253	SNAP AFTER CROSSFADE	2	0
253	OBJECT TEXTURE SELECTOR COARSE 1	254	SNAP BEFORE CROSSFADE	3	0
254	OBJECT TEXTURE SELECTOR FINE 1	255	SNAP BEFORE CROSSFADE	4	0
255	OBJECT TEXTURE SELECTOR COURSE 2	256	SNAP BEFORE CROSSFADE	5	0
256	OBJECT TEXTURE SELECTOR FINE 2	257	SNAP BEFORE CROSSFADE	6	0
257	OBJECT R	258	CROSSFADE	7	255
258	OBJECT G	259	CROSSFADE	8	255
259	OBJECT B	260	CROSSFADE	9	255
260	OBJECT ANIMATION STEP	261	SNAP AFTER CROSSFADE	10	0
261	OBJECT ANIMATION SPEED	262	SNAP AFTER CROSSFADE	11	128
262	AUTO ROTATE X	263	SNAP BEFORE CROSSFADE	12	0
263	AUTO ROTATE Y	264	SNAP BEFORE CROSSFADE	13	0
264	AUTO ROTATE Z	265	SNAP BEFORE CROSSFADE	14	0
265	OBJECT X POS COARSE	266	CROSSFADE	15	128
266	OBJECT X POS FINE	267	CROSSFADE	16	128
267	OBJECT Y POS COARSE	268	CROSSFADE	17	128
268	OBJECT Y POS FINE	269	CROSSFADE	18	128
269	OBJECT Z POS COARSE	270	CROSSFADE	19	128
270	OBJECT Z POS FINE	271	CROSSFADE	20	128
271	OBJECT X SCALE COARSE	272	CROSSFADE	21	64
272	OBJECT X SCALE FINE	273	CROSSFADE	22	64
273	OBJECT Y SCALE COARSE	274	CROSSFADE	23	64
274	OBJECT Y SCALE FINE	275	CROSSFADE	24	64
275	OBJECT Z SCALE COARSE	276	CROSSFADE	25	64
276	OBJECT Z SCALE FINE	277	CROSSFADE	26	64
277	OBJECT X ROT COARSE	278	SNAP BEFORE FADE	27	0
278	OBJECT X ROT FINE	279	SNAP BEFORE FADE	28	0
279	OBJECT Y ROT COARSE	280	SNAP BEFORE FADE	29	0
280	OBJECT Y ROT FINE	281	SNAP BEFORE FADE	30	0
281	OBJECT Z ROT COARSE	282	SNAP BEFORE FADE	31	0
282	OBJECT Z ROT FINE	283	SNAP BEFORE FADE	32	0

Object 3

283	OBJECT INTENSITY	284	CROSSFADE	1	0
284	OBJECT 3D ENTITY SELECTOR	285	SNAP AFTER CROSSFADE	2	0
285	OBJECT TEXTURE SELECTOR COARSE 1	286	SNAP BEFORE CROSSFADE	3	0
286	OBJECT TEXTURE SELECTOR FINE 1	287	SNAP BEFORE CROSSFADE	4	0
287	OBJECT TEXTURE SELECTOR COARSE 2	288	SNAP BEFORE CROSSFADE	5	0
288	OBJECT TEXTURE SELECTOR FINE 2	289	SNAP BEFORE CROSSFADE	6	0
289	OBJECT R	290	CROSSFADE	7	255
290	OBJECT G	291	CROSSFADE	8	255
291	OBJECT B	292	CROSSFADE	9	255
292	OBJECT ANIMATION STEP	293	SNAP AFTER CROSSFADE	10	0
293	OBJECT ANIMATION SPEED	294	SNAP AFTER CROSSFADE	11	128
294	AUTO ROTATE X	295	SNAP BEFORE CROSSFADE	12	0
295	AUTO ROTATE Y	296	SNAP BEFORE CROSSFADE	13	0
296	AUTO ROTATE Z	297	SNAP BEFORE CROSSFADE	14	0
297	OBJECT X POS COARSE	298	CROSSFADE	15	128
298	OBJECT X POS FINE	299	CROSSFADE	16	128
299	OBJECT Y POS COARSE	300	CROSSFADE	17	128
300	OBJECT Y POS FINE	301	CROSSFADE	18	128
301	OBJECT Z POS COARSE	302	CROSSFADE	19	128
302	OBJECT Z POS FINE	303	CROSSFADE	20	128
303	OBJECT X SCALE COARSE	304	CROSSFADE	21	64
304	OBJECT X SCALE FINE	305	CROSSFADE	22	64
305	OBJECT Y SCALE COARSE	306	CROSSFADE	23	64
306	OBJECT Y SCALE FINE	307	CROSSFADE	24	64
307	OBJECT Z SCALE COARSE	308	CROSSFADE	25	64
308	OBJECT Z SCALE FINE	309	CROSSFADE	26	64
309	OBJECT X ROT COARSE	310	SNAP BEFORE FADE	27	0
310	OBJECT X ROT FINE	311	SNAP BEFORE FADE	28	0
311	OBJECT Y ROT COARSE	312	SNAP BEFORE FADE	29	0
312	OBJECT Y ROT FINE	313	SNAP BEFORE FADE	30	0
313	OBJECT Z ROT COARSE	314	SNAP BEFORE FADE	31	0
314	OBJECT Z ROT FINE	315	SNAP BEFORE FADE	32	0

Objects 4, 5 & 6 (Future Development)

315	NULL	**316**	CROSSFADE	**1**
316	NULL	**317**	SNAP AFTER CROSSFADE	**2**
317	NULL	**318**	SNAP BEFORE CROSSFADE	**3**
318	NULL	**319**	SNAP BEFORE CROSSFADE	**4**
319	NULL	**320**	SNAP BEFORE CROSSFADE	**5**
320	NULL	**321**	SNAP BEFORE CROSSFADE	**6**
321	NULL	**322**	CROSSFADE	**7**
322	NULL	**323**	CROSSFADE	**8**
323	NULL	**324**	CROSSFADE	**9**
324	NULL	**325**	SNAP AFTER CROSSFADE	**10**
325	NULL	**326**	SNAP AFTER CROSSFADE	**11**
326	NULL	**327**	SNAP BEFORE CROSSFADE	**12**
327	NULL	**328**	SNAP BEFORE CROSSFADE	**13**
328	NULL	**329**	SNAP BEFORE CROSSFADE	**14**
329	NULL	**330**	CROSSFADE	**15**
330	NULL	**331**	CROSSFADE	**16**
331	NULL	**332**	CROSSFADE	**17**
332	NULL	**333**	CROSSFADE	**18**
333	NULL	**334**	CROSSFADE	**19**
334	NULL	**335**	CROSSFADE	**20**
335	NULL	**336**	CROSSFADE	**21**
336	NULL	**337**	CROSSFADE	**22**
337	NULL	**338**	CROSSFADE	**23**
338	NULL	**339**	CROSSFADE	**24**
339	NULL	**340**	CROSSFADE	**25**
340	NULL	**341**	CROSSFADE	**26**
341	NULL	**342**	SNAP BEFORE FADE	**27**
342	NULL	**343**	SNAP BEFORE FADE	**28**
343	NULL	**344**	SNAP BEFORE FADE	**29**
344	NULL	**345**	SNAP BEFORE FADE	**30**
345	NULL	**346**	SNAP BEFORE FADE	**31**
346	NULL	**347**	SNAP BEFORE FADE	**32**
347	NULL	**348**	CROSSFADE	**1**
348	NULL	**349**	SNAP AFTER CROSSFADE	**2**
349	NULL	**350**	SNAP BEFORE CROSSFADE	**3**
350	NULL	**351**	SNAP BEFORE CROSSFADE	**4**
351	NULL	**352**	SNAP BEFORE CROSSFADE	**5**
352	NULL	**353**	SNAP BEFORE CROSSFADE	**6**
353	NULL	**354**	CROSSFADE	**7**
354	NULL	**355**	CROSSFADE	**8**
355	NULL	**356**	CROSSFADE	**9**
356	NULL	**357**	SNAP AFTER CROSSFADE	**10**
357	NULL	**358**	SNAP AFTER CROSSFADE	**11**
358	NULL	**359**	SNAP BEFORE CROSSFADE	**12**
359	NULL	**360**	SNAP BEFORE CROSSFADE	**13**
360	NULL	**361**	SNAP BEFORE CROSSFADE	**14**
361	NULL	**362**	CROSSFADE	**15**
362	NULL	**363**	CROSSFADE	**16**
363	NULL	**364**	CROSSFADE	**17**
364	NULL	**365**	CROSSFADE	**18**
365	NULL	**366**	CROSSFADE	**19**
366	NULL	**367**	CROSSFADE	**20**
367	NULL	**368**	CROSSFADE	**21**
368	NULL	**369**	CROSSFADE	**22**
369	NULL	**370**	CROSSFADE	**23**
370	NULL	**371**	CROSSFADE	**24**
371	NULL	**372**	CROSSFADE	**25**
372	NULL	**373**	CROSSFADE	**26**
373	NULL	**374**	SNAP BEFORE FADE	**27**
374	NULL	**375**	SNAP BEFORE FADE	**28**
375	NULL	**376**	SNAP BEFORE FADE	**29**
376	NULL	**377**	SNAP BEFORE FADE	**30**
377	NULL	**378**	SNAP BEFORE FADE	**31**
378	NULL	**379**	SNAP BEFORE FADE	**32**
379	NULL	**380**	CROSSFADE	**1**
380	NULL	**381**	SNAP AFTER CROSSFADE	**2**

381	NULL	**382**	SNAP BEFORE CROSSFADE	**3**
382	NULL	**383**	SNAP BEFORE CROSSFADE	**4**
383	NULL	**384**	SNAP BEFORE CROSSFADE	**5**
384	NULL	**385**	SNAP BEFORE CROSSFADE	**6**
385	NULL	**386**	CROSSFADE	**7**
386	NULL	**387**	CROSSFADE	**8**
387	NULL	**388**	CROSSFADE	**9**
388	NULL	**389**	SNAP AFTER CROSSFADE	**10**
389	NULL	**390**	SNAP AFTER CROSSFADE	**11**
390	NULL	**391**	SNAP BEFORE CROSSFADE	**12**
391	NULL	**392**	SNAP BEFORE CROSSFADE	**13**
392	NULL	**393**	SNAP BEFORE CROSSFADE	**14**
393	NULL	**394**	CROSSFADE	**15**
394	NULL	**395**	CROSSFADE	**16**
395	NULL	**396**	CROSSFADE	**17**
396	NULL	**397**	CROSSFADE	**18**
397	NULL	**398**	CROSSFADE	**19**
398	NULL	**399**	CROSSFADE	**20**
399	NULL	**400**	CROSSFADE	**21**
400	NULL	**401**	CROSSFADE	**22**
401	NULL	**402**	CROSSFADE	**23**
402	NULL	**403**	CROSSFADE	**24**
403	NULL	**404**	CROSSFADE	**25**
404	NULL	**405**	CROSSFADE	**26**
405	NULL	**406**	SNAP BEFORE FADE	**27**
406	NULL	**407**	SNAP BEFORE FADE	**28**
407	NULL	**408**	SNAP BEFORE FADE	**29**
408	NULL	**409**	SNAP BEFORE FADE	**30**
409	NULL	**410**	SNAP BEFORE FADE	**31**
410	NULL	**411**	SNAP BEFORE FADE	**32**

Mask

411	2D OVERLAY MASK INTENSITY FRONT 1	412	CROSSFADE	1	0
412	2D OVERLAY MASK SELECTOR COARSE FRONT	413	SNAP BEFORE FADE	2	0
413	2D OVERLAY MASK SELECTOR FINE FRONT	414	SNAP BEFORE FADE	3	0
414	LIVE 1 X POS COURSE FRONT	415	SNAP BEFORE FADE	4	128
415	LIVE 1 X POS FINE FRONT	416	SNAP BEFORE FADE	5	128
416	LIVE 1 Y POS COURSE FRONT	417	SNAP BEFORE FADE	6	128
417	LIVE 1 Y POS FINE FRONT	418	SNAP BEFORE FADE	7	128
418	2D OVERLAY MASK VERT/HOR SCROLLING	419	SNAP BEFORE FADE	8	128
419	2D OVERLAY MASK FRECUENCY/SENSE SCROLLING	420	SNAP BEFORE FADE	9	128
420	2D OVERLAY MASK INTENSITY BACK 1	421	CROSSFADE	10	0
421	2D OVERLAY MASK SELECTOR COARSE BACK	422	SNAP BEFORE FADE	11	0
422	2D OVERLAY MASK SELECTOR FINE BACK	423	SNAP BEFORE FADE	12	0
423	LIVE 1 X POS COURSE BACK	424	SNAP BEFORE FADE	13	128
424	LIVE 1 X POS FINE BACK	425	SNAP BEFORE FADE	14	128
425	LIVE 1 Y POS COURSE BACK	426	SNAP BEFORE FADE	15	128
426	LIVE 1 Y POS FINE BACK	427	SNAP BEFORE FADE	16	128
427	2D OVERLAY MASK VERT/HOR SCROLLING	428	SNAP BEFORE FADE	17	128
428	2D OVERLAY MASK FRECUENCY/SENSE SCROLLING	429	SNAP BEFORE FADE	18	128

Live Text

429	LIVE TEXT INTENSITY	430	CROSSFADE	1	0
430	FILE COARSE	431	CROSSFADE	2	0
431	FILE FINE	432	CROSSFADE	3	0
432	TEXT R COLOR	433	CROSSFADE	4	255
433	TEXT G COLOR	434	CROSSFADE	5	255
434	TEXT B COLOR	435	CROSSFADE	6	255
435	TEXT SCALE X	436	CROSSFADE	7	128
436	TEXT SCALE Y	437	CROSSFADE	8	128
437	TEXT SCALE Z	438	CROSSFADE	9	128
438	AUTO ROTATE X	439	CROSSFADE	10	0
439	AUTO ROTATE Y	440	CROSSFADE	11	0
440	AUTO ROTATE Z	441	CROSSFADE	12	0

The Chart above explains the default values for all 10 fixtures that comprehend the SD3D media generator. There are 7 types of fixtures; each one behaves quite similar to a moving light:

- **GLOBAL Fixture (1)**
- **VIDEO Fixture (2)**
- **LIVE VIDEO (1)**
- **PARTICLE Fixture (1)**
- **3D OBJECT Fixture (3)**
- **Overlay Mask Fixture (1)**
- **3D Live Text (1)**

TOTAL Fixtures: 10

The NULL channels represented in grey color are for future development. Please note the DMX address for every fixture as:
GLOBAL: DMX Channel address 2
VIDEO 1: DMX Channel address 32
VIDEO 2: DMX Channel address 62
LIVE VIDEO: DMX Channel address 122
PARTICLE 1: DMX Channel address 170
3D OBJECT 1: DMX Channel address 220
3D OBJECT 2: DMX Channel address 252
3D OBJECT 3: DMX Channel address 284
OVERLAY MASK: DMX Channel address 412
3D LIVE TEXT: DMX Channel address 430

Glossary

Video

analog media -- Audio sources, such as audio cassettes and microphones, and video sources, such as VHS and 8mm VCRs and camcorders that must be digitized and converted into digital format for processing by a computer. Newer digital formats such as DV and DVD have higher resolution and quality than older consumer formats like VHS, and also do not degrade in quality when they are copied from one generation to the next. See also *component video, composite video, digital media*.

digital media -- Audio and video sources such as audio CD, DV, miniDV, Digital8 camcorders, and DVD that store the audio and video in digital format. As a result, the data can be imported and processed directly by a computer, and copied without any loss from one generation to the next. See also *analog media, DV*.

composite video -- A video signal that combines the brightness (luminance or luma) and the color (chrominance or chroma) video information into one signal. Because the signal is not modulated, composite video provides higher quality than RF video. Requires a separate audio signal and connector. Also called **Baseband** video. See also *component video, DV, RF video, S-Video.*

component video -- A video signal that separates the video signal into three separate signals (and three separate wires) to avoid any quality loss from mixing signals. The components can be RGB (red, green, and blue); luma (Y) and two chroma signals, such as Y, Y-R, Y-B; or other formats including YUV, YCbCr, or Y Pr Pb. Requires a separate audio signal and connector. See also *composite video, DV, RF video, S-Video.*

luminance -- The intensity or brightness of a video signal, usually represented by the letter Y. Video signals are split into separate luma and chroma (color) components for higher-quality and more efficient transmission and encoding. In YUV color format, for example, the color information stored in U and V (the color difference signals).

chrominance -- The color of a video signal. Video signals are split into separate luma and chroma (color) components for higher-quality and more efficient transmission and encoding. The chroma signal is typically split into two components or color difference signals, such as YUV format. See also *luminance*.

RGB -- Acronym for Red, Green, Blue. Full-color video signal format, consisting of three elements. See also *YUV*.

YUV -- Full-color video signal format, consisting of three elements: Y (luminance), and U and V (chrominance). See also *RGB.*

frames -- The individual video images that make up a moving sequence. Video formats and individual clips are typically described in terms of the resolution of the individual frames, and the frame rate at which they are played. See also *frame rate, field*.

frame rate -- Playback speed as determined in frames per second (**fps**). See also *sample rate.*

frame (or 3 and then 2). Both terms are often used interchangeably to describe the effect.

Digital Video Formats

FireWire -- A digital data interface standard that provides a high-speed Plug-and-Play interface for personal computers. Used for connecting DV camcorders to computers, as well as to hard disk drives and DVD drives. Supports up to 480 Mbps data rate. Also known as **IEEE 1394** and Sony iLink. See also *USB*.

FireWire connector -- A roughly rectangular, hot-pluggable connector used for FireWire/IEEE 1394 digital connections, especially digital video signals such as from DV camcorders. The connectors can vary in size: full-size (6-pin) for connecting to a computer or hub, and smaller (4-pin) for connecting to equipment such as DV camcorders. See also *BNC connector*, *DV*, *F connector*, *RCA connector*, S-*Video connector*.

USB (Universal Serial Bus) -- A digital data interface standard providing a Plug-and-Play interface for personal computers. Typically used for lower-speed peripherals such as mice, keyboards, printers, and scanners. Also used for interfacing to digital cameras. The existing USB 1 standard provides up to 12Mbps (million bits per second) data rate. The new USB 2 standard supports up to 480Mbps data rate. See also *FireWire*.

AVI -- Acronym for **Audio Video Interleave**. The old multimedia file format used under Windows for interleaved video and audio streams. See also *Video for Windows*, *Windows Media*.

Video for Windows -- The media file format used with Microsoft Windows (.AVI). Supports many different video and audio compression formats (*codecs*). See also *Windows Media*.

Windows Media -- The multimedia platform built into Microsoft Windows, and a series of formats for storing and transmitting video and audio. Uses ASF, WMA, and WMF file types. See also *Video for Windows, Windows Media Audio* and *Windows Media Video.*

Windows Media Video (WMV) -- The Microsoft Windows Media format for compressed video and audio files on CD and DVD discs. See also *Windows Media Audio*.

QuickTime -- Multiplatform, multimedia **Movie** file format from Apple Computers (.**MOV**).

MPEG -- A family of popular multimedia file formats and associated compression schemes defined by the **Moving Pictures Expert Group**. MPEG-1 video was designed for use on CD-ROMs and provides picture quality somewhat comparable to VHS. MPEG-2 video was designed for consumer video and is used on DVD, and can provide high-quality full-screen full-rate video with smaller file sizes. MPEG-4 video is designed for a broad range of multimedia applications, and is used for web and wireless streaming video. MP3 is a commonly-used audio compression format, especially for web downloads and portable music players.

MPEG-1 -- An older digital video compression format developed in the early 1990s by the Moving Picture Experts Group. MPEG-1 video was designed for lower-resolution video played from CD-ROM and provides picture quality somewhat comparable to VHS (typically 352x240 resolution). Used for Video CD discs.

MPEG-2 -- A TV-quality digital video compression format developed in the mid-1990s by the Moving Picture Experts Group. MPEG-2 video provides high-quality full-screen full-rate video (720x480 resolution for NTSC) with smaller file sizes than MPEG-1. Used for DVD discs, and also scales to high-definition resolution and bitrates.

MPEG-4 -- A digital multimedia compression format developed in the late 1990s by the Moving Picture Experts Group, that includes video, audio, and interactivity. MPEG-4 video is designed for interactive multimedia across networks, and works well for web and wireless streaming video.

CBR -- Acronym for **Constant Bit Rate**. A compression scheme in which each unit of input material is always compressed to the same output size. For MPEG-2 video, for example, this means that the compressed data always has the same data rate (that is, bytes per second), even when the input material is very easy to encode. See also *VBR*.

VBR -- Acronym for **Variable Bit Rate**. A compression scheme in which each unit of input material can be compressed to different sizes. For MPEG-2 video, for example, this means that "easier" sequences (that is, with no motion) can compress to very small sizes, whereas "hard" sequences (with lots of motion and scene cuts) can compress to much larger sizes. VBR compression can take better advantage of the overall available bandwidth of a video transmission or DVD player by allocating the available bits intelligently to the difficult parts of a sequence. See also *CBR*.

Digital Still Image Formats

BMP -- The standard Windows bitmap still image file format. Bitmap files are not compressed, and are therefore significantly larger than the same image stored in formats such as GIF and JPEG.

GIF -- Acronym for **Graphics Interchange Format**. A still image file format commonly used on web pages for simple illustrations and animations. Use the JPEG format for photographic images.

JPEG -- A still image file format developed by the **Joint Photographic Experts Group** that can compress photographic images into much smaller file sizes while sacrificing only a little image quality. Commonly used for photographs on web pages and in e-mail. See also *GIF*.

PICT -- The standard Apple Macintosh still image Picture file format.

TIFF -- A lossless image file format designed for photographic images that compresses the image size while preserving all the image quality. The resulting files are therefore larger than those with JPEG compression, which sacrifices some detail in order to significantly reduce the image size.

Digital Data Rates

data rate -- The speed at which data is transferred, as in bytes per second. Also called bit rate. For example, the speed to download or stream a video file over the Internet, or the speed at which the file must play from a hard disk. When you create a video or audio file, you can specify the target bit rate at which the file will be played. Also called **bit rate**.

bitstream -- A collection of data, as in video or audio data compressed to a file or transmitted between devices.

bit -- A **binary digit**. The fundamental element of computer logic and numbers. Represents one of two values: zero or one, off or on, false or true. See also *byte*.

byte -- A data element containing **eight bits**, or 256 distinct values. Commonly used to store a single text character. Computer data transfer rates are traditionally measured in bits, as in Mb for Megabits (millions of bits, with a lower-case "b"); whereas computer data storage is traditionally measured in bytes, as in MB, for megabytes (millions of bytes, with an upper-case "B"). See also *bit, GB, KB, MB*.

MB -- **Megabytes (millions of bytes)**. In computer use, a megabyte actually represents the closest binary power of 2 to a million, or 1024 squared. See also *byte, GB, KB.*

GB -- **Gigabytes (billions of bytes**). In computer use, a gigabyte actually represents the closest binary power of 2 to a billion, or 1024 cubed. In general use in advertising DVD disc capacity, however, the number of "GB" is actually used to specify a different value, a billion decimal. See also *byte, KB, MB.*

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